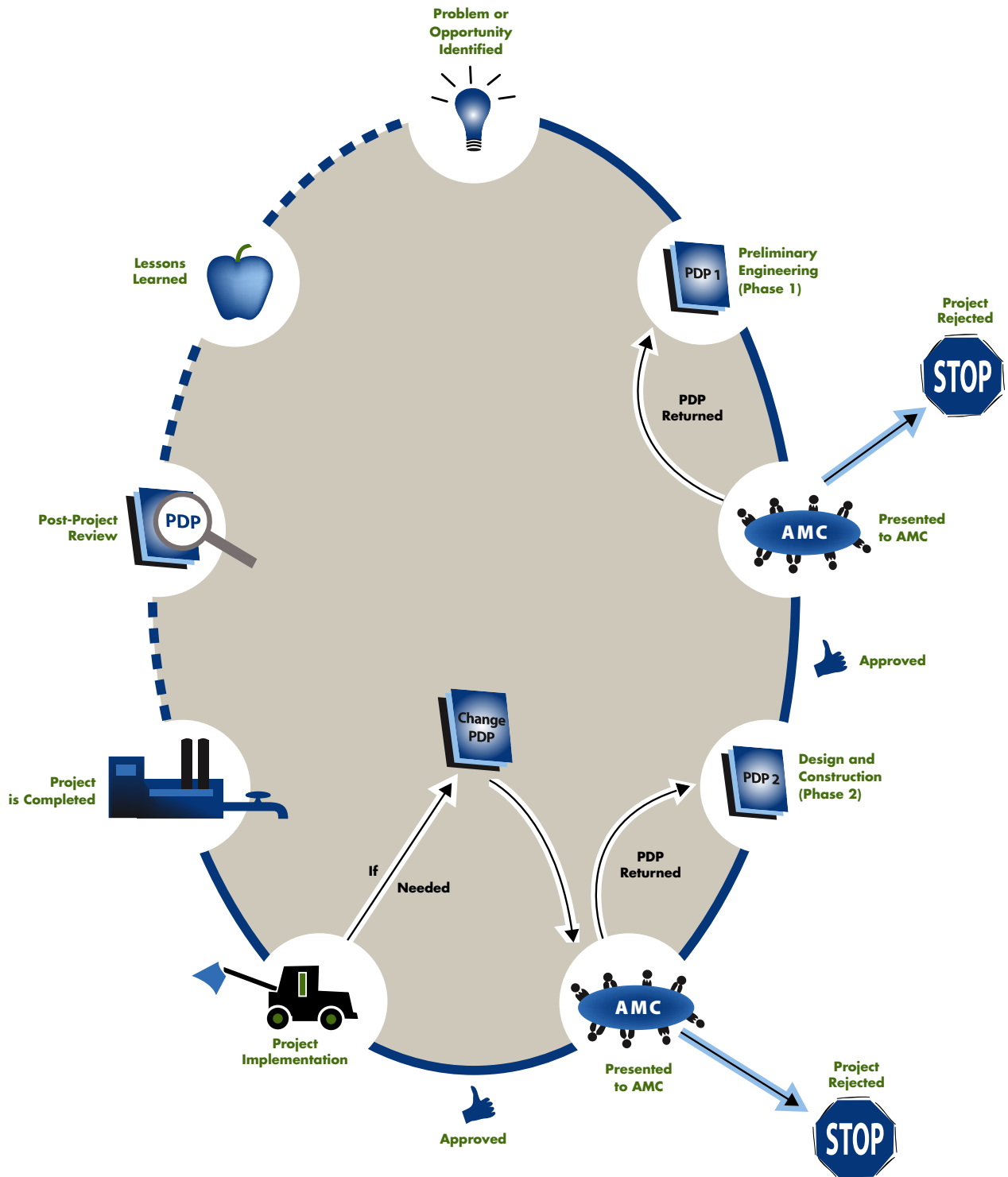


# Quick Start Guide

## Project Development Plans



Seattle Public Utilities



## Introduction

Purpose of Guide .....	3
Project Development Plans .....	3
When Do I Start a PDP? .....	4
Thresholds .....	4
PDP Process .....	4
The Model for Using PDPs .....	9

## Getting Started

Visit the Web .....	9
Schedule your PDP .....	10
Form your Team .....	10
Training .....	10
How to Use the Quick Start Guide .....	11
Sample PDPs Available .....	11

## Step 1—Framing the Problem

Benefits .....	12
Costs .....	13
Establishing Function and Value .....	14
Defining Options .....	14
<i>The Base Case: Do Nothing vs. Status Quo</i> .....	15
<i>The Options: Delivering Function and its Value</i> .....	17
Choosing Type of Analysis .....	17

## Step 2—Data and Analysis

Know the Economic Terms .....	20
<i>Triple Bottom Line Analysis</i> .....	20
<i>Net Present Value</i> .....	20
<i>Perspectives</i> .....	21
<i>Risk Cost</i> .....	22
Gather Raw Data .....	22
Make Analysis Efficient .....	23
Use the Spreadsheets .....	24
<i>How to Enter Data into the Spreadsheets</i> .....	25
<i>Entering Capital Costs</i> .....	26
<i>Entering O&amp;M Costs</i> .....	26
<i>Entering Social Costs</i> .....	27
<i>Entering Environmental Costs</i> .....	27
<i>Entering Risk Costs</i> .....	27
<i>Entering Benefits</i> .....	28
Calculate Present Value to Determine NPV .....	29
Select Rules for Analyzing NPV and Life-cycle Costs .....	30

## Step 3—Presenting the Results

AMC Requirements for Format .....	31
<i>Table of Contents</i> .....	31
<i>AMC Summary Form</i> .....	31
<i>Background</i> .....	31
<i>Objectives</i> .....	32
<i>Options</i> .....	32
<i>Benefit/Cost Analysis</i> .....	32
<i>Recommendation</i> .....	32
Creating the Perspectives Summary Table .....	33
Creating the NPV Chart .....	34
Showing the Results of Sensitivity Analysis .....	35
Select Rules for Presenting Economic Analysis .....	36

## List of Figures

Fig 1. NPV Spreadsheet .....	25
Fig 2. NPV Formula .....	29
Fig 3. NPV Discounting .....	29
Fig 4. Perspectives Summary Table .....	33
Fig 5. Options NPV Chart .....	34
Fig 6. Sensitivity Analysis Chart .....	35

## Appendices

Appendix A: Quick Reference Card .....	37
--	----

**Quick Start Guide**  
*The Quick Start Guide gives instruction in a consistent method for doing the analysis, compiling information, and presenting it to the AMC.*



**AMC**  
*The Asset Management Committee, or AMC, is a group of SPU Branch Executives and others who review PDPs. The AMC approves or rejects funding for projects based on information and analysis presented in the PDP.*



## Purpose of Quick Start Guide

The *Quick Start Guide* is designed to make Project Development Plans (PDPs) easier to write and review. Specifically, the *Guide*:

- ***Applies to PDPs Required for Funding Approval***
- ***Sets standards for content and methodology***
- ***Outlines a presentation format.***

By following the *Quick Start Guide*, PDP authors help the Asset Management Committee (AMC) make well-informed resource allocation decisions.

## Asset Management at SPU

Asset management at SPU is defined as, “Meeting agreed customer and environmental service levels while minimizing lifecycle costs.” SPU’s asset management approach requires making decisions about how we allocate resources. We intend for these decisions to be made fully informed by the following:

- ***Life-cycle costs***
- ***Triple bottom line benefits***
- ***System risks***
- ***SPU’s ability to operate the system and maintain its infrastructure***
- ***Resource limitations***
- ***All related impacts***

*The AMC wants these considerations transparently made and clearly documented. PDPs help us do that.*

## Project Development Plans

A Project Development Plan (PDP) is the decision-making tool the AMC uses to make funding decisions on capital projects.

A successful PDP provides quantitative evidence that a project or program will meet SPU’s Asset Management goals.

PDPs are prepared in the early stages of capital improvement project or program (CIP) design as a systematic means of analyzing the benefits and costs of various options. The PDP describes a strategy for achieving a project’s objective and sets criteria by which we judge project success.

A central part of the PDP is a **triple-bottom-line** economic appraisal. The triple bottom line considers not only **financial** (capital, O&M, disposal, etc.), but also **social** and **environmental** benefits and costs. Quantifying and evaluating project options based on the triple bottom line results in a better return to SPU’s customers and the community.

[The Triple Bottom Line Guidebook](#) contains in-depth information on this topic.

### Which Projects Need a PDP?

*Before it approves funding, the AMC requires a PDP for all projects with a total cost of **\$250,000 or more**.*

*Projects costing less than \$250,000 require a PDP that is reviewed and approved by the relevant CIP Committee.*



## When Do I Start a PDP?

Capital projects require approval at various points throughout their implementation. The starting point for the first PDP is early in the planning phase after identifying a problem, opportunity or policy that could lead to a capital project, but before a solution is identified. The final project option that is recommended for funding should be selected through the PDP process—not before it. The PDP submitted to the AMC documents how the recommended project was selected.

## Thresholds

The AMC has funding authority for all capital investments. It has delegated approval authority for certain funding decisions to individuals or other decision-making forums. Currently, the AMC must approve funding for projects with estimated lifecycle costs (CIP and O&M) of \$250,000 or more. See AMC Delegations for more detail on thresholds and Change PDPs. [AMC Delegations](#)

The AMC reviews all projects that meet the following criteria:

- **Total project cost of \$250,000 or more**
- OR**
- **Determined important for reasons other than cost.**

The CIP committee for the relevant line of business approves projects costing less than \$250,000.

## PDP Process

The AMC was established in 2002 to function as the decision making body within SPU for capital project and program funding, and to serve as the final authority for the establishment of Service Levels.

SPU's Asset Management approach requires making deliberate decisions regarding allocation of resources.

The AMC intends for these decisions to be made fully informed by knowledge of life cycle costs; triple bottom line risks and benefits; system risks; our ability to operate our system and maintain our infrastructure; resource limitations; and all the related impacts.

It is the expectation of the AMC that staff assessment of these considerations will be prepared and presented in a transparent manner for decisions by the AMC or other decision-making forums, and we document such decisions.

Also, it is the expectation of the AMC that Specifiers check back with the decision maker(s) as they determine necessary – when key milestones are reached and/or changes to the decision criteria are identified – i.e., pursuant to the Change PDP requirements.

For the efficient operation of the AMC, and for the sake of fairness among those wanting AMC time, it is important to define a process and format for AMC decisions and presentations. The AMC reviews many, many PDPs and other materials over the course of the year and so AMC meetings are very tightly scheduled.

The AMC requests that you set a realistic, achievable timeline for your PDP since failure to meet the deadlines could result in you not being prepared adequately for the AMC. And, if your AMC presentation must be postponed because you're not prepared or have not received necessary approvals, this may impact others seeking AMC time, and your project schedule may be delayed.

- Every PDP should be initiated and directed by a Business Area Manager or specifier. The specifier is responsible (and to the extent that they want to delegate to the preparer) for making sure that certain critical review and document submittal dates are met. The specifier is also responsible for ensuring that any post-PDP approval follow-up items are delivered on time, and that a Change PDP is brought before the AMC if necessary.
- The specifier needs to work with the capital fund manager to identify available funding for both the CIP and O&M (??) portions of the project.
- There are 3 types of PDPs.
  - PDP #1 covers the phase in which we decide to authorize preliminary engineering and requires a less rigorous options analysis than PDP #2. Minimum requirements are spelled out in the "Requirements for Preliminary Engineering Phase of PDP" document.
  - PDP #2 occurs after preliminary engineering is completed and requires more rigorous analysis of the options.
  - Change PDPs are required if there is a substantial change in project scope, schedule, or cost from what was originally authorized (see AMC Delegations Table).

## Pre-AMC Process

- In order to obtain AMC time, contact Liz Kelly – preferably via e-mail. This can be done as far in advance as desired. Allow no less than six weeks to prepare the PDP as it generally takes awhile to do the technical and financial analysis, receive input from reviewers, and conduct a dry run. More complex projects and programs require more time. Be sure to allow adequate time to adequately frame your PDP ("framing" entails defining the problem, identifying the related service levels, and exploration of alternatives).
- Work towards your AMC date but assume there will be some flexibility for schedule changes until you "lock" into a date. Locking in works like this: about six weeks in advance of your AMC presentation you'll be asked to lock into that date. Those first to lock in will be first to be scheduled and the last to be bumped. If you need to

reschedule after “locking” in, the Executive Sponsor must ask for another date and will need to explain to the AMC why the PDP had to be rescheduled. Until you lock in you may be bumped to another date.

- Your PDP will be assigned an Executive Sponsor, Capital Fund Manager, Field Operations liaison, economist, and a Corporate Asset Management reviewer; it is up to the specifier to determine if other reviewers, such as a science team, corporate risk, safety, or security specialist, are required.
  - The Field Ops Branch liaison's role is to ensure that the operations and maintenance life cycle impacts have been adequately and appropriately characterized and represented in the PDP. Contact Brian Spindor at 684-8512 to have a Field Operations liaison assigned to your project.
  - The role of the economist is to work closely with the preparer to understand the objectives and various alternatives in enough detail to ensure that the economic analysis is done properly. Contact Jenny Bagby at 684-7808 to have an economist assigned to your project.
  - The role of the CAM Reviewer is to work with the Specifier to ensure that SPU's asset management principles have been followed for preparation of the PDP. Contact Liz Kelly at 6-9779 to have a CAM Reviewer assigned.
  - The role of the Capital Fund Manager is to identify where the capital funding will come from and raise to the attention of the AMC any instance where a funding request, if approved, will create problems for one of the funds.

***Eugene Mantchev for Water Fund***

***Neil Thibert for Drainage & Wastewater Fund***

***Henry Friedman for Solid Waste Fund***

***Charlie Spear for Information Technology***

## The Role of the Executive Sponsor is to:

- Be available to the PDP Specifier and/or preparer as necessary to provide guidance,
- Resolve outstanding issues associated with decision-making tools to which they are assigned,
- Ensure that materials are of the appropriate quality for AMC review,
- Ensure that AMC protocols (particularly with regard to review by stakeholders) are followed,
- Be engaged in processes adequately to ensure that the item is ready for AMC review and if not, pull the item no later than ten days prior to each AMC, and
- Ensure that follow-up actions are appropriately documented in meeting summaries (completion of the follow-up actions is not necessarily the responsibility of the Exec Sponsor, since project implementation is often conducted in a branch separate from that of the Exec Sponsor).
- Executive Sponsors are not necessarily advocates for the proposals to which they are assigned (note that the five listed roles for Exec Sponsor do not require advocacy).

- Complete the Project Development Plan Summary and Project Approval Form. Always check with the AM web page for the most current version of the forms. (Note specifically regarding the “Budget Impact” section: Please make sure this section is clear. If the format of this section [i.e., rows and columns] is not conducive to clarity, please change the format and/or add footnotes to make clear to the AMC what the budget is, what has previously been approved by the AMC, and if appropriate, what the new funding request is.)
- Prepare the PDP using the Standard Template. Review Other PDPs if you are not familiar with preparing one.
- Provide a complete draft of your PDP to the Executive Sponsor, all key reviewers (those listed above plus others as necessary and/or requested by the Executive Sponsor, the Specifier, or the CAM Reviewer), and the e-mail address “SPU AMC” no later than close of business 12 days in advance of the AMC presentation date (typically this will be two Fridays in advance).
- Conduct a dry run with your Executive Sponsor and other relevant people at least a week before your presentation date. Just when and how this occurs is actually at the discretion of the Specifier and the Exec Sponsor, but typically they want the dry run to be about a week in advance of the AMC meeting. Note that due to busy schedules and difficulty in getting the appropriate people involved, it may be necessary to schedule this several weeks in advance.
- The specifier is ultimately responsible for providing final written materials, including the Summary Form (with sign-offs by all key reviewers and the Executive Sponsor), to the e-mail address “SPU AMC” no later than noon on the Friday in advance of the AMC date.
- If it’s too difficult to actually obtain the Executive Sponsor’s and other reviewers’ dated signature in a timely manner, an e-mail approval from the Executive Sponsor can substitute for the actual signature. The e-mails must be attached to the approval form.
- Please send your materials in a format that can be easily opened (not Visio or Project files). If your material is in these formats, please convert to a .pdf file. If more than one file makes up your PDP, please let Rosalyn Martin (typically she is the recipient of the “SPU AMC” e-mails and the compiler of the materials), or your CAM Reviewer know how to sequence them in the package. If there are documents or parts of documents for which it is important to print in color, let Rosalyn know and we’ll try and accommodate. Please do not send your materials twice - it creates confusion to the very time sensitive AMC Advance Material compiling effort.
- Copy your AMC Presentation materials to the common folder, AMC Green Room (J:/Di-Off/WS130/Secure/AMC Green Room). This folder can be accessed from SMT 4901, where most of the AMC meetings are held. Please also copy any handouts you provide at the AMC to this common folder.
- CAM will distribute materials to the AMC (and others on the AMC distribution list) by COB on Friday prior to the AMC meeting for their advance reading.



## Post-PDP Approval Process

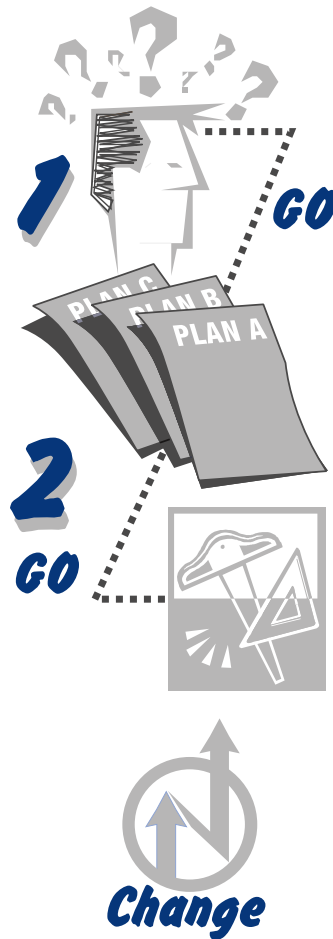
- Any “to do” items, requests for additional information, or other action items generated by AMC members in AMC meetings shall “return” to AMC – either with a follow-up PDP, briefing, or with a memo to AMC documenting how the request was fulfilled. The specifier is responsible for these items and needs to coordinate with the Executive Sponsor for completion and submittal to AMC.
- A Change PDP is required if there is a substantial change in project scope, schedule, or cost from what was originally submitted. See the AMC Delegations Table to determine if you are required to submit a Change PDP.

Also, work with the service provider to complete a service agreement, using the Service Agreement template. The agreement is between the specifier and the service provider and details who is accountable for what. It may be appropriate to complete this in advance of the AMC in order for the specifier to actually make the project delivery commitments. Whether this occurs in advance or following AMC funding approval is at the discretion of the Specifier

The Project Management Guide shows how PDPs fit into the overall framework for CIP project management. [SPU Project Management Guide](#)



# introduction



## The Model for Using PDPs

PDPs support all new CIP projects. The AMC authorizes the plans, typically in phases, with a PDP prepared or updated at each of two major decision points:

### 1. Initial Project Concept.

This is PDP #1. It covers the phase in which we decide to authorize preliminary engineering and complete a more rigorous options analysis. Project concept follows identification of a problem or opportunity, and an initial analysis of the benefits and costs of options. The minimum PDP analysis requirements for this phase are spelled out in the [Requirements for Preliminary Engineering Phase of PDP document](#).

### 2. Conclusion of Preliminary Engineering.

This is PDP #2. In this PDP, we focus on the data needed for the AMC decision to authorize design—or in some cases—design and construction. Analytical

rigor for the economic appraisal in a PDP produced for this phase is higher than that for initial project concept.

### 3. Project Change PDPs.

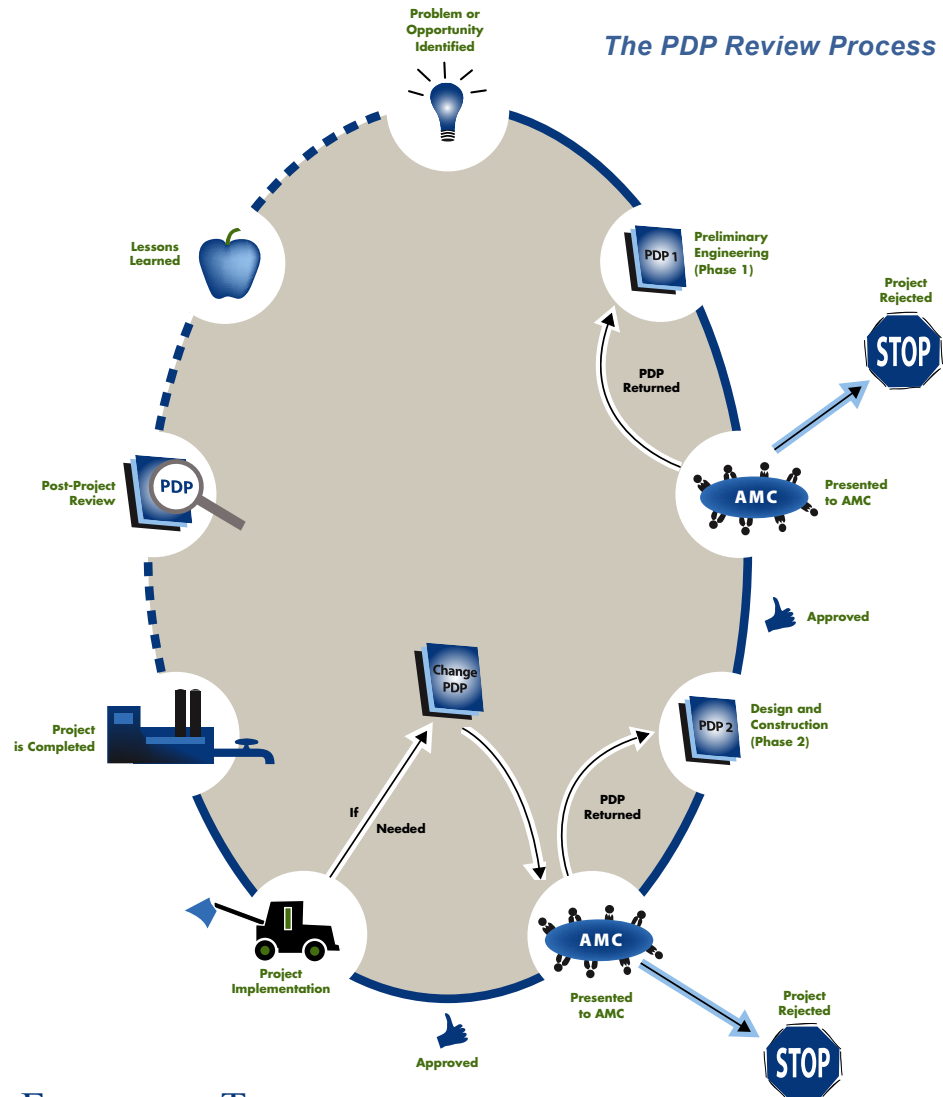
A change PDP is required if there is a substantial change in project scope, schedule, or cost from that originally authorized. At this point, the AMC either approves changes and the project proceeds into construction or the project is stopped. Additional changes may require additional Project Change PDPs. (See “AMC Delegations” for the generic requirements for Project Change PDPs.) The AMC may set project-specific change parameters that will be decided on when PDP 1 or PDP 2 are approved. PDP preparers can propose project-specific parameters if they feel variation from the generic change is appropriate.

## Visit the Web

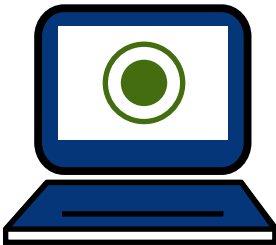
The *Quick Start Guide* relies heavily on the [Asset Management website](#) for links to forms and other information. Visit the site before you start. Most resources you’ll need for a PDP are available there.

## Schedule your PDP

The AMC meets periodically to review PDPs and approve or reject funding. Visit the [Asset Management Website](#) to see the current schedule and e-mail Liz Kelly to schedule a presentation date. Allow enough time between the start of PDP development and the date of your AMC presentation. Depending on complexity, a PDP may take from one to several months to organize and complete.



PDP Online  
Visit the Asset  
Management  
Website.



## Form your Team

Each PDP must have an Executive Sponsor. It must include input and reviews by an economist, a capital fund manager, an Operations Branch liaison, and a representative of the Corporate Asset Management (CAM) team. Assembling the team, clarifying rules of the various participants and making plans early helps in completing a successful PDP. E-mail Liz Kelly to be assigned an Executive Sponsor and CAM reviewer. Jenny Bagby (684-7808) will assign an economist and Brian Spindor (684-8512) an Operations Branch liaison.

## Training

PDP training is offered periodically. Visit the Asset Management website for more information or contact Tim Skeel (6-9084)

Read the Guide  
*Preparing a PDP is not rocket science, but some information will be new. Take time to read the Quick Start Guide. Many terms and concepts used in the Guide are specific to preparing PDPs.*



Quick Card  
*The Quick Card is a checklist for completing a PDP. It lists where you can find more detailed explanation in the Guide.*



## How to Use the Quick Start Guide

The *Quick Start Guide* gives step-by-step instruction for completing a PDP. The *Guide* explains key economic methods and can help you more easily research and write a PDP.




Instructions follow a logical progression and require close reading. Each topic covered in the *Guide* includes a shaded example illustrating a key concept.

**The *Guide* organizes development of a PDP around three principal tasks:**

- 1. Framing the Problem**
- 2. Gathering data and conducting the analysis**
- 3. Presenting the results of analysis in a uniform SPU standard.**

Breaking your efforts into these three steps makes organizing a PDP much more manageable. The Quick Reference Card [<<Appendix A>>](#) that accompanies the *Guide* summarizes the steps.

The steps covered in the *Guide* are given greater detail in the [Triple Bottomline Guide-book](#). The following list shows where to look.

Quick Start Guide	Triple Bottom Line Guidebook
 <b>Step 1</b> <b>FRAMING THE PROBLEM</b>	<b>Chapter 1: Definition of the Project/Program and Its Alternatives</b>
 <b>Step 2</b> <b>DATA AND ANALYSIS</b>	<b>Chapter 2: Identification and Description of Project TBL Effects</b> <b>Chapter 3: TBL Perspectives to Consider and Present</b> <b>Chapter 4: TBL Effect Quantification</b>
 <b>Step 3</b> <b>PRESENTING RESULTS</b>	<b>Chapter 5: Impact Valuation: Tools and Approach Selection</b> <b>Chapter 6: Evaluation Tools and Procedures</b> <b>Chapter 7: Standards for Result Presentation</b>

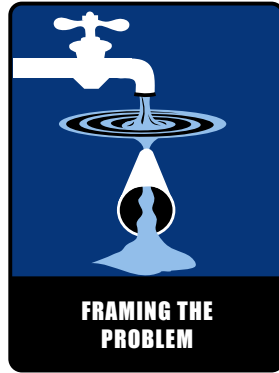
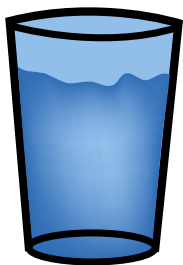
## Sample PDPs Available

Several completed PDPs are available online. Visit the Asset Management website to see what a finished product looks like. [Sample PDP's](#)

## Benefits

*Some benefits from SPU services:*

- *Clean drinking water*
- *Sanitary wastewater collection and conveyance*
- *Timely and safe solid waste disposal*
- *Clean surface water*



## Step 1: Framing the Problem

The first step in developing a PDP is to define both the objective and options for meeting it in a way that supports quantitative benefit/cost analysis. To do that, it helps to have a good understanding of five key terms:

- **Benefits**
- **Costs**
- **Function**
- **Value**
- **Objective.**

## Benefits

Project benefits generally come from the value SPU's services generate for the customer. The magnitude of the benefits depends on the particular service level provided.

Benefits from SPU services include reliable delivery of high-quality drinking water, stormwater control and good customer service.

Benefits may also include "spillover" value. Spillover value is generated for the community from aesthetics, public safety, protection of private property, or habitat improvement. Sometimes utility operational efficiencies (life-cycle cost savings) and avoided future costs also show up in the benefits column.

## Benefit/Cost Analysis

Benefit/cost analysis—as applied in SPU's Triple Bottom Line approach—is more than financial. It considers a wider range of benefits and costs for a project. Financial analysis concentrates on the direct financial effects on the agency sponsoring the project. It includes capital as well as operations and maintenance (O&M) and disposal costs. Triple Bottom Line analysis, on the other hand, includes such financial analysis but also considers any social or environmental benefits or costs to customers and the community.

As you'll see in Step 2, we compute benefits by assigning a dollar value to the project's function.

## Costs

Costs of SPU services include the following:

- *Capital: design, materials, construction, disposal*
- *O&M: energy, labor, rehab, repair*
- *Social and environmental impacts*



# step 1: framing the problem

## Costs

Costs include capital, O&M and other direct costs of providing a service, as well as any external “spillover” costs imposed on the community or the environment.

At this point, however, we’re defining—not quantifying—the project. Number crunching lies ahead in Step 2. In Step 1, we want to begin by answering a series of questions about the project’s benefits and costs. This task will take us through three main activities in this order:

- 1. Establish function, value and objective**
- 2. Define options**
- 3. Choose the type of analysis.**

## Establishing Function and Value

To quantify a project’s benefits, you must consider its function and the value of that function to customers and the community.

**Answer the following questions to begin to quantify customer and community benefits:**

- ✓ ***What is the function of the project? What problem or opportunity does the project address?***
- ✓ ***What value to the customer and the community does the function provide? What value would be realized by solving the problem or taking advantage of the opportunity?***

### Function, Value and Objective

Function is the primary service or output of the project. The function of a project is usually required to solve a problem or take advantage of an opportunity.

Value is what customers or the community believe that function is worth.

The project objective is to deliver the function and its value.

### Example:

The function of a particular stormwater drainage project is to reduce the problem of street flooding. The value to the community of that function comes from improved street passage. The objective is to reduce flooding to improve street passage during storms.

## Example: Establishing Function and Value

Consider a proposed project to solve a water distribution pressure and flow problem. A new water tank is one way to provide the function to solve the problem. The project's value comes from its function to provide higher water pressure and increased flow for customers' convenience and to the community to fight fires—a higher service level.



The objective is to increase pressure and flow to improve pressure and firefighting service levels.

Identifying the function and objective must precede identifying a particular solution—a specific “project.” To identify the need for a new tank before identifying the need to improve service levels puts the cart before the horse. The proper order of capital planning is to identify the objective, the function required to meet that objective, and then find optional ways to provide that function. A new tank becomes a project only after it is deemed the best way to meet an objective.

## Defining Options

So far, you have established the problem to be solved (or opportunity to be secured) and the function, value and objective.

Next, you need to consider options that can meet the objective by providing that function and delivering its value.

This step is really two activities:

1. **Defining the base case (“Do Nothing” or “Status Quo”)**
2. **Developing the options.**

### Base Case

The base case is a clearly defined reference point for weighing the benefits and costs of options to meet a project objective.

The base case is usually called “Do Nothing” or “Status Quo.”

First, you must define a reference point—a base case from which the benefits and costs of the options can be compared. Start by defining the base case as the “Status Quo” or “Do Nothing” option. Answer these questions to start:

- ✓ **What function will not be fulfilled under the “Do Nothing” or “Status Quo” option?**
- ✓ **What value to customers or the community will not be attained under the “Do Nothing” or “Status Quo” option? What problem will be unsolved or opportunity unclaimed?**

## The Base Case: Do Nothing vs. Status Quo

How you characterize the base case really depends on the underlying reason for the project. SPU takes on CIP projects for three basic reasons:

- 1. Desire to increase service levels*
- 2. Problem with maintaining current service levels due to impending failure of existing systems*
- 3. Opportunity to meet current service levels at a lower life-cycle cost than with existing systems.*

**Defining the base case is a crucial step that requires judgment and creativity. Think about it like this:**

### Reason #1: Increase Service Levels

If the reason for the project is to increase service levels above current levels, do nothing and status quo are probably the same thing. The higher service level is not provided in either case, and no new costs are incurred in either case.

### Reason #2: Pending Failure

If the reason for the project is a problem with a failing asset, do nothing might mean allowing it to fail. We stop providing the asset's function altogether. On the other hand, status quo could mean continuing to maintain the asset's function with repairs and "work-arounds," eventually replacing it on final failure. In this case, do nothing and status quo have different implications for costs and benefits.

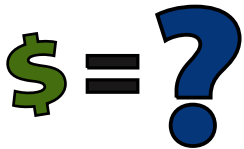
### Reason #3: Lower Cost

Finally, if the reason for the project is to provide the current function at lower cost, status quo probably means keep providing the function with the existing system. Do nothing could mean stop providing the function altogether. We eliminate the current system and don't replace it. Again, the benefit and cost implications differ for do nothing and status quo.

Status quo is usually the more realistic option for how SPU would respond if the proposed project is not undertaken. Do nothing, however, is an interesting test for the project. It forces considering the value of the function that would not be provided. Not providing the function may be the best option when value and cost are considered.



Value and Function  
*In defining the base case, you answer the question: What is the value of the function to be provided?*



## step 1: framing the problem

### Example: Defining a Base Case

While there aren't fixed rules for determining the base case, our water pressure and flow example illustrates how project objective (reason the project is proposed) affects this important reference point. Let's review the three reasons we do capital projects at SPU.



**Reason #1:** If the objective is to increase service levels over current, then both status quo and do nothing mean SPU would not undertake a project. We would not provide increased pressure and flow above current levels.

**Reason #2:** On the other hand, if the objective is to replace an existing but failing tank to maintain current service levels, then status quo could mean continuing to "work" with the old tank to maintain its function as long as possible. This option entails increasing risk of failure and eventual replacement on final failure.

By comparison, do nothing would abandon the tank and its function upon failure. No new project would be built to meet the objective of maintaining pressure and flow. The potential value of maintaining service and fire fighting capability wouldn't happen.

**Reason #3:** Finally, if the objective is to replace an existing, but more costly, system of delivering pressure and flow (a pump station), status quo keeps the existing system functioning. The do nothing base case assumes the function could end. Do nothing might be a preferred option if the value of a function is less than the least-cost way of delivering it.

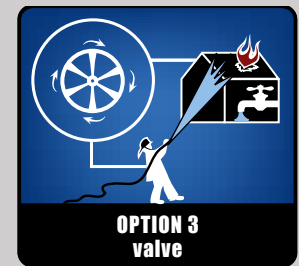
## The Options: Delivering Function and its Value

Next, you develop options for providing the function and delivering its value. You look for alternative ways to meet the objective (e.g., to solve the problem). Answer this question:

- ✓ In what ways could SPU provide the function and value and meet the objective?

### Example: Defining Options

As well as a new water tank, SPU could install a new pump, construct a new pipe (feeder line) from a higher elevation, change district valve configuration, or alter demand patterns to reduce system peaks. Some of these are operational solutions. Options should not be limited to capital projects. All options serve the function of increasing pressure and flow to improve service to customers and the community.



## Choosing Type of Analysis

Project benefits come from the value the identified function generates for the community. Sometimes, the “need” for the function is unquestionable—the value is very high. Regulations require certain SPU functions—the Clean Water Act, for instance. Some functions are of such high value they must be provided. Examples of must-do? Clean drinking water, safe and controlled stormwater discharge, sanitary solid waste disposal. For these must-do functions, doing nothing is not an option.

At the end of Step 1, you determine whether your project falls into the “must-do” function category.

For must-do functions, you may complete a cost-effectiveness analysis. Cost-effectiveness analysis is a simple life-cycle cost comparison of options that deliver the “must-do” function and value.

**“Must-Do” Functions**  
*These are regulatory-driven or core-service functions. SPU must provide:*

- *Clean drinking water*
- *Environmentally safe stormwater discharge*
- *Sanitary disposal of solid waste*

*For must-do functions, the goal of the PDP is to find the lowest life-cycle cost for providing that function.*



All other projects require a benefit/cost analysis. Benefit/cost analysis is more complicated than cost-effectiveness analysis because you must determine the dollar value to customers and the community of the project function.

We distinguish the types of analysis for two reasons. First, if your project qualifies, a cost-effectiveness analysis takes less time than a benefit/cost analysis. Secondly, distinguishing the “must-do” projects from other “may-or-may-not-do” projects avoids potential confusion in presenting your analysis to the AMC (Step 3).

### Life-cycle Costs

Life-cycle cost is the present value of all costs associated with a project over its lifetime, discounted at a certain rate. Life-cycle costs include capital investment, ongoing O&M, disposal, social and environmental and all other costs incurred through the end of project life.

**Answer the following questions to decide which type of analysis you need:**

- ✓ ***Is the objective to meet a regulatory requirement or maintain a core service of unquestionable value? Is “do nothing” an untenable option?***
- ✓ ***Do all the options provide the same function and value to customers and the community?***

If the answer to both is “yes,” then you do a simple cost-effectiveness analysis.

If the answer to either is “no,” then you must do a benefit/cost analysis.

## “May-or-May-Not-Do” Functions

These functions involve service-level choices above minimum. Or they may be benefits to the community if cost-justified.

- Reducing customer “wait-time” on service calls
- Increasing water pressure above minimum
- Reducing nuisance flooding
- Improving service reliability above minimum
- Adding aesthetic value to a neighborhood

All are functions for which doing nothing is a viable option. The goal of the PDP is to select the option with the highest benefits over costs.



### Need Help?

Not certain you’ve done enough? Having difficulty with some part of this preparation step? Ask an economist.

## step 1: framing the problem

### Which Analysis: Cost-Effectiveness or Benefit/Cost?

**Here are some illustrations of how to choose the correct type of analysis.**

#### Stormwater Core Service

If SPU is legally required to limit combined sewer overflows (CSOs) to one per year, then the PDP analysis needs only to find the lowest life-cycle cost to do that. Simple cost-effectiveness analysis will do.

But . . . if the project would go beyond required levels, say, to no more than one CSO every two years, we need to quantify the benefit to customers and the community of reducing CSOs beyond requirements. We must now do a benefit/cost analysis.

#### Wastewater Core Service

Let’s look at a wastewater “must-do” function. Benefits are unquestionable for continued collection and conveyance of sanitary sewer. Again, we need only to compare life-cycle costs of different options for that service.

#### Solid Waste Core Service

The same goes for accepting solid waste at SPU transfer stations. As with the other examples, the relevant economic choice is the lowest life-cycle cost of continuing the service. We do cost-effectiveness analysis. However, if the project function is to reduce the wait time in lines at the transfer station, then your PDP needs to quantify the value of that reduction. We complete a benefit/cost analysis.

At this point, you’ve completed Step 1. You’ve prepared the benefit/cost analysis by:

- Establishing the project’s function and value to customers
- Defining options to meet the objective
- Choosing the type of analysis.

## Bring An Economist on Board

Next is Step 2, Data and Analysis. In this step, we quantify the values we have established. These values become quantified benefits that we compare to quantified costs. We offer tools for gathering and analyzing this data. If you haven’t yet, you are required to bring in the economist assigned to your PDP. You may also want to consult the [Triple Bottom Line Guidebook](#) for additional guidance.

SPU meets a Triple Bottom Line

*Triple Bottom Line analysis means putting dollar values where possible on financial, environmental and social costs and benefits.*

*While familiar with financial costs, most project managers need help valuing social and environmental benefits and costs.*

*Help is available. Ask the economist assigned to your PDP.*



## Step 2: Data and Analysis

In Step 2, you gather data and conduct the analysis. Completing Step 2 requires that you have a working knowledge of the following:

- **Triple Bottom Line analysis**
- **Net present value**
- **Benefit and cost perspectives**
- **Risk Cost**

This section of the Guide defines these more advanced economic terms. It also describes tools—such as a Net-Present-Value (NPV) spreadsheet—that will make analysis faster and easier.

### Know the Economic Terms

When you understand the following terms, you can use the Quick Reference Card <<Appendix A link>> to calculate your project's net present value.

### Triple Bottom Line Analysis

SPU has adopted a triple bottom line approach to economic analysis. The triple bottom line does just what it says. It looks at three areas of benefits and costs: financial, social, and environmental. Triple bottom line analysis differs from typical financial analysis because it considers benefits and costs accruing to the community as a whole and assigns (where possible) dollar values to non-market-priced social and environmental impacts. The Triple Bottom Line Guidebook <<File:\\spucommon-svr\COMMON\DirOff\WS130\Secure\Asset Management\TBL>> provides in-depth explanation of this analysis.

### Net Present Value

Benefit/cost analysis calculates the value of benefits generated from a project over its lifetime. Then it compares that value to the costs incurred by the project over its lifetime. This benefit-to-cost comparison is often represented by a single number we call a project's net present value.

Net Present Value (NPV) is the difference in the present value of the benefit stream and the present value of the cost stream. The larger this number, the better the project's performance. From an asset management viewpoint, we serve the community better with a higher NPV.

### Net Present Value

$$\text{NPV} = \text{Present Value Benefits} - \text{Present Value Costs}$$

#### Example: Choose the Highest NPV

Let's suppose we are comparing two options: Option A and B. If Option A has present value of benefits equal to \$100, and present value of costs equal to \$75, it has an NPV of \$25. If Option B has present value of benefits equal to \$120 and present value of costs equal to \$100, it has an NPV of \$20. In this case, Option A is preferred to Option B.

$$\text{NPV of Option A} = \$100 - \$75 = \$25$$

$$\text{NPV of Option B} = \$120 - \$100 = \$20$$

### Perspectives

To assess all community benefits and costs, you must show to whom those benefits and costs accrue. We call this “defining perspectives.” Perspectives link benefits and costs to various groups. Perspectives identify who incurs costs and who receives benefits from the project or program. These groups may include direct beneficiaries, all SPU ratepayers or customers, the entire region or beyond. The AMC may choose a project or program based on a narrow SPU customer perspective, a broader regional perspective, or some perspective in-between. The AMC decides which perspective to use in making its decision.

#### Example: Perspectives




Suppose a drainage project's function is to improve stormwater discharge quality that benefits the whole region by enhancing fish habitat. A spillover benefit of the project is aesthetic improvements to the neighborhood. SPU will fund the capital cost through drainage rates. Neighborhood volunteers will perform required maintenance to keep the project functioning. The Perspectives Summary Table shows the estimate of the costs and benefits according to perspective. Notice the triple bottom line. Capital is financial cost (F) while maintenance is a social cost (S) and aesthetics is a social benefit (S). Improving habitat is an environmental benefit (E).

You prepare the Perspectives Summary Table in Step 3, Presenting Results to the AMC.

## Perspectives

*Perspectives identify who incurs costs and who receives benefits from the project or program.*

Perspectives Summary Table

	Neighbors 	Ratepayers 	Rest of Region 	Total
Capital Cost (F)		\$500,000		\$500,000
O&M Costs (S)	\$15,000			\$15,000
Habitat Benefits (E)		\$250,000	\$250,000	\$500,000
Aesthetic Benefits (S)	\$100,000			\$100,000
NPV	\$85,000	-\$250,000	\$250,000	\$85,000

## Risk Cost

The presence of risk can make benefit/cost analysis tricky. Risk cost is a special cost category that allows us to quantify risk exposure. We calculate risk as the product of the probability of the risk event times the consequence cost of the event. (This is an actuarial concept called “expected value.” Insurance companies use this calculation to determine what rate to charge.) You express risk cost as an annual cost by using the annual probability multiplied by consequence. Then you use this annual risk cost stream to calculate the project’s NPV. For further guidance, review SPU risk assessment methodology. <<File:\\spucommon-svr\\COMMON\\DirOff\\WS130\\Secure\\Asset Management\\Risk Assessment>> The SPU Risk Assessment document gives detail on the latest SPU approach to risk assessment.

### Example: Risk Cost = Likelihood x Consequence

If the annual chance of failure is 10%, and the cost of failure is \$1,000, the risk cost is \$100 per year. We include this amount as an annual cost over the life of the project.

Example: Risk Cost = Likelihood x Consequence

## Gather the Raw Data

Before you can begin the analysis, you must gather the data. You will need the cost estimates for all the options, and the dollar estimates for the benefits from each option. The PDP is a triple bottom line analysis. You’ll need social and environmental costs and benefits, as well as the usual financial costs and benefits. The Triple Bottom Line Guidebook offers further information on quantifying social and environmental impacts <<File:\\spucommon-svr\\COMMON\\DirOff\\WS130\\Secure\\Asset Management\\TBL>> Your economist can help you with triple bottom line concerns.



For more guidance on this topic, see the [Cost Estimating Guidelines](#). Those guidelines clearly explain the following:

- **Capital cost estimating rules**
- **Use of contingencies**
- **Operations**
- **Maintenance**
- **Future renewal**
- **Disputes**

## Tip: Make the Analysis Efficient

The familiar 80/20 rule applies to economic analysis as well. You can probably get 80% of what's possible out of the analysis for about 20% of the effort. And 80% is often good enough to make an unambiguous project decision. Once all costs have been estimated, it may become clear that not all the benefits have to be quantified to know which option is superior. At that point, you may stop quantifying those benefits, although you should be able to describe them qualitatively.

### Example: The 80/20 Rule

Suppose Option A is found to have \$100 in benefits and \$50 in costs. Option B has \$110 in quantified benefits and \$40 in costs and an additional unquantified benefit from reduced pollution. Since Option B has \$10 in quantified benefits, and \$10 less in costs, even without the additional benefits from reduced pollution, it is preferable to Option A. We do not need to quantify the benefits from reduced pollution to know that Option B is preferred to A.

	Option A	Option B*
Benefits	\$100	\$110 (quantified)
- Costs	\$50	\$40
= Net Benefits	\$50	\$70 (quantified)

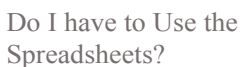
*\* Option B has unquantified pollution benefits*

*The benefits from reduced pollution can simply be described. They serve to further emphasize the superiority of B over A.*

Another way to avoid quantifying hard-to-quantify benefits or costs is to determine the minimum (or maximum) value that would determine which option is preferred. A question can then be posed to the AMC: Would a reasonable person accept that value as representing a lower (or upper) bound on the true value?

This is called the "reasonable person's test." It allows a project decision to be made without quantifying certain hard-to-quantify benefits or costs.





*Your PDP may require a more specialized approach for which you will need to develop your own spreadsheet. Or you may have a spreadsheet you prefer.*

Using the numbers from the 80/20 example, suppose Option B costs \$70. Without quantifying the benefits of reduced pollution with Option B, we don't know for certain which to prefer. We do know that if the pollution benefits are valued at more than \$10 by the community, we want Option B. If they are not valued at least \$10, then we go with Option A.

	Option A	Option B*
Benefits	\$100	\$110 (quantified)
- Costs	\$50	\$70
= Net Benefits	\$50	\$40 (quantified)

*If these benefits are valued at a minimum of \$10, then Option B is preferred.*

## Use the Spreadsheets

You can select either a life-cycle cost spreadsheet or an NPV spreadsheet. The spreadsheets differ only in presentation of output. Both have formulas that calculate present values from dollar amounts you enter.

If your project requires a benefit-cost analysis, use the NPV spreadsheet to calculate NPV.

<<File:\spucommon-svr\COMMON\DirOff\WS130\Secure\Asset Management\Excel  
Template>>

Instructions are similar for both.

## How to Enter Data into the Spreadsheets

The following instructions show how to enter your data into the spreadsheets. Even if you use your own spreadsheet, you must enter the data as shown:

- Input costs and benefits by type, perspective and year in which the cost or benefit occurs.
- Excel then calculates the NPV (or life-cycle cost).

Enter project title

Create a Worksheet for each option

Project Title		
YEAR PERIOD NO	Perspective	01/04 0
<b>CAPITAL COSTS</b>		
<b>TOTAL CAPITAL COSTS</b>		-
<b>OPERATION &amp; MAINTENANCE COSTS</b>		
<b>TOTAL OPERATING COSTS</b>		-
<b>SOCIAL COSTS</b>		
<b>TOTAL SOCIAL COSTS</b>		-
<b>ENVIRONMENTAL COSTS</b>		
<b>TOTAL ENVIRONMENTAL COSTS</b>		-
<b>ANNUAL RISK COSTS</b>		
<b>TOTAL RISK COSTS</b>		-
<b>TOTAL COSTS</b>		
		-
<b>FINANCIAL BENEFITS</b>		
<b>TOTAL FINANCIAL BENEFITS</b>		-
<b>SOCIAL BENEFITS</b>		
<b>TOTAL SOCIAL BENEFITS</b>		-
<b>ENVIRONMENTAL BENEFITS</b>		
<b>TOTAL ENVIRONMENTAL BENEFITS</b>		-
<b>TOTAL BENEFITS</b>		
		-
<b>PRESENT VALUE of COSTS</b>		
<b>PRESENT VALUE of BENEFIT</b>		-
<b>CUMULATIVE PRESENT VALUE of COSTS</b>		
<b>CUMULATIVE PRESENT VALUE of BENEFITS</b>		-
<b>CUMULATIVE PRESENT VALUE (B-C)</b>		-
<b>DISCOUNT FACTOR</b>		
<b>TOTAL PRESENT VALUE of COSTS</b>		\$
<b>TOTAL PRESENT VALUE of BENEFITS</b>		\$
<b>BENEFIT to COST RATIO</b>		
<b>NET PRESENT VALUE (NPV)</b>		\$
<b>DISCOUNTED PAYBACK PERIOD (YRS)</b>		

Figure 1. Net Present Value (NPV) Spreadsheet



## step 2: data and analysis

### Entering Capital Costs

The first major section is for capital costs. These costs include planning, design, construction, permitting, commissioning and end-of-life decommissioning or disposal cost of a capital asset. These are usually the large up-front costs involved in undertaking project.

- 1. Enter a description of the cost (design, construction, etc.) in the Type column.*
- 2. List who pays this cost in the Perspective column. In most cases, this is SPU, but some projects may have either part or all capital cost paid by another party.*
- 3. Enter the cost of the item in the Year column*

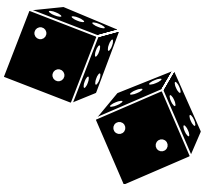
### Entering O&M Costs

The next major section is operation and maintenance (O&M) costs. These costs are incurred annually in running and keeping up the capital asset. O&M costs include energy, labor, rehab, repairs or other ongoing costs associated with the project.

- 1. Enter a description (e.g., energy for pumping, regular replacement of seals), in the Type column.*
- 2. List who pays this cost in the Perspective column. Usually, this is SPU.*
- 3. Enter the costs for the O&M item in the Year column.*

### Tips

- ✓ If there are less frequent but recurrent costs (e.g., repainting every 10 years), you may enter those here or above under capital costs. Where you enter recurrent cost does not affect NPV.
- ✓ Put recurrent costs under capital costs above if they will be paid out of capital funds (a CIP project), and
- ✓ Put the recurrent costs under O&M if they will be treated as O&M for financial purposes.
- ✓ Operations consults with Ops liaison regarding information needed to provide the OFM cost estimates.



## Entering Social Costs

The third major input is social costs. Social costs include project impacts involuntarily imposed on others who do not necessarily benefit from the project. Social costs are distinguished from environmental costs by including impacts on time, safety, recreation, property, convenience, equity, justice, pain and suffering. These costs often arise in projects because of traffic disruption, diminished aesthetics, or service outages. Social costs usually do not have a direct market price. You 'll need an economist to estimate the dollar value.

- 1. Enter a description of the social impact in the Type column.**
- 2. List who is impacted in the Perspective column.**
- 3. Enter the cost of the item in the Year column. If your project has significant social costs associated with it, estimate the dollar value here.**

## Entering Environmental Costs

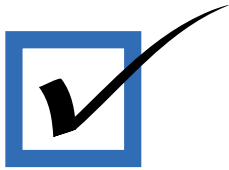
The fourth major input section is environmental costs. Environmental costs are those negative impacts on air or water quality, habitat, species, ecosystem function and human health. Environmental costs usually do not have a market price, so you will need assistance from your economist to estimate the dollar value.

- 1. Enter a description of the environmental impact in the Type column.**
- 2. List who is impacted in the Perspective column.**
- 3. Enter the cost of the item in the Year column. If your project has significant environmental loss associated with it, estimate the dollar value here**

## Entering Risk Costs

The fifth input section is for risk costs. These costs arise from events that might occur but are unplanned, infrequent or random. Risk costs include asset or operational failure. The failure can have an internal cause (e.g., material failure, or operator error) or outside event (e.g., earthquake or flood). Before completing this risk cost section, consult [<<File:\\spu-common-svr\\COMMON\\DirOff\\WS130\\Secure\\Asset Management\\Risk Assessment>>.](file:///C:/common-svr/COMMON/DirOff/WS130/Secure/Asset%20Management/Risk%20Assessment/) This document gives further detail on risk, and the latest SPU approach to risk assessment.

- 1. Calculate risk cost as an annual cost equal to the annual probability of occurrence times the consequence or damage cost. Risk costs may be financial, social or environmental.**
- 2. Enter a description of the risk costs in the Type column.**
- 3. List who pays in the Perspective column.**
- 4. Enter the cost of the item in the Year column for each year in which the risk applies.**



## step 2: data and analysis

### Entering Benefits

The final major section is project benefits. Benefits are direct or incidental value generated for customers and the community. Benefits may be financial, social or environmental. Enter them in the appropriate section of the spreadsheet. Benefits may also include utility cost savings compared to the base case, which would be listed under financial benefits.

- 1. Enter a description of the benefits in the *Type* column**
- 2. List who receives the benefits in the *Perspectives* column**
- 3. Enter the dollar benefit of the item in the *Year* column for each year in which the benefit applies.**

#### Tips

- ✓ Recall that there are two types of analysis: cost-effectiveness and benefit/cost. If you're doing cost-effectiveness analysis, your project may not have any benefits to enter (or it may, see next tip). We're interested in the least-cost option that performs the project's function.
- ✓ If completing a cost-effectiveness analysis, be aware that some must-do options may have different incidental "spillover" benefits. For example, suppose one of the options to provide a must-do water quality function may also provide additional community social benefits from open space that other options do not. Enter those benefits in the *Type* column as instructed in 1 above. The spreadsheet template then uses these benefits to offset costs in the life-cycle cost calculation.
- ✓ If completing a benefit/cost analysis, you must enter the benefits the project will achieve (i.e., those stemming from the value of the project function to customers and the community), as well as any "spillover" benefits that are quantified.



## Calculate Present Value to Determine NPV

We must calculate the present value of both the benefit and cost flows to determine the NPV. The formula for computing NPV is:

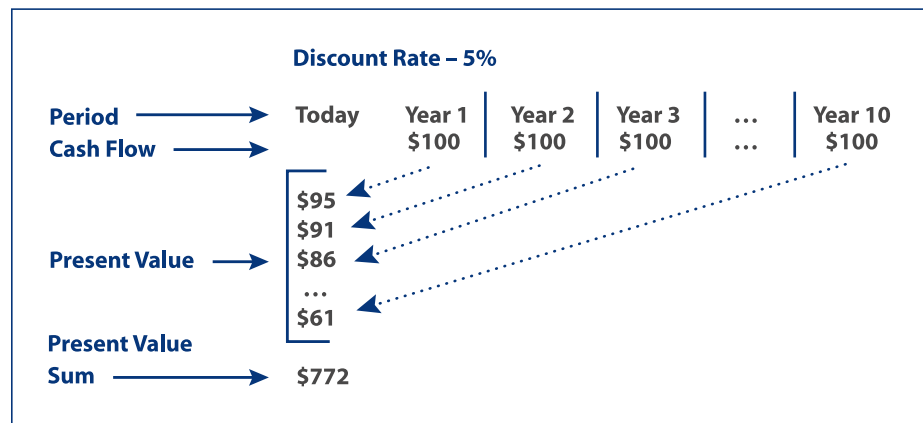
**NPV Formula**  
 $\text{Sum}(\$t/(1+r)^t)$

where:

**\$t** = cash value in year **t**  
**r** = discount rate

**Figure 2. NPV Formula**

Excel has built-in functions for this. The chart below shows how the cash flow stream is discounted at 5%.




**Figure 3. NPV Discounting**

The discount rate reflects both the underlying value of time and the risk associated with future cash flows.

## Select Rules for Analyzing NPV and Life-cycle Costs

Certain Rules of Economic analysis apply to both NPV and life-cycle costs. These rules are listed below and on the Quick Card.

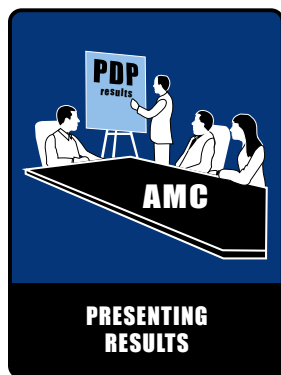
	<p><b>Labor rate multiplier.</b> SPU uses overhead and fringe multipliers to calculate its labor cost. The multiplier is 108% of hourly wage rate. Because the multiplier accounts for nonbillable (vacation, sick, etc.) hours, you must adjust for that if you use annual FTE salary rather than hourly wage. Reduce the FTE annual salary by 15.4% before applying the multiplier. See <a href="#">Labor Cost Multiplier</a>. Ask your economist for help.</p>
	<p><b>Equipment rates.</b> See <a href="#">Equipment Cost Standards</a> for current SPU standards for equipment charges.</p>
	<p><b>Discount rate.</b> Use constant-year dollars and a real discount rate. See <a href="#">Discount Rate Standards</a> for current SPU standard discount rate. You will also show the impacts of varying the discount rate, as discussed later under Sensitivity Analysis.</p>
	<p><b>Life Assumptions.</b> Take cash flow analysis as far as the longest life option. If the cash flow ends with significant life remaining on capital assets for any option, you must make an adjustment for value remaining. Ask your economist.</p>

After you've entered all the data, Excel will calculate NPV as described on the previous page. Continue to Step 3, Presenting Results to AMC.

## PDP

*The PDP presents the business case for achieving your project's objectives.*

Get the PDP Template  
Visit the Asset Management website for a downloadable [PDP template](#).



## Step 3 Presenting the Results

The final step in developing a PDP is to bundle the results of your economic analysis for presentation to the AMC. This section of the *Guide* shows how to assemble a PDP and other PDP components. We also explain how to turn the NPV spreadsheet into a Perspectives Summary, which is a chart for simplifying your results.

### AMC Requirements for Format

Use the [PDP template](#) available on the Asset Management website. Each section of your PDP must use correct information presented in the following order:

### Table of Contents

The PDP should include the following contents:

- **AMC Summary Form**
- **Background**
- **Objectives**
- **Options (including proposed project)**
- **Benefit/Cost Analysis (or Cost-Effectiveness Analysis)**
- **Recommendations.**

### AMC Summary Form

This is a summary sheet that must be attached to all PDPs. [AMC Project Summary and Funding Approval Form](#)

### Background

The Background section should:

- ***Outline the problem or opportunity that led to the proposed project or program***
- ***Provide relevant history, name the key stakeholders and list other important information***
- ***Describe the service levels involved.***



Benefit/Cost Analysis  
*This section of a PDP uses two data tables to summarize your results:*

- Perspectives Summary
- Options NPV Chart

## Objectives

The Objectives section of a PDP describes the function of the proposed project or program.

- ***Explain the function of the proposed project***
- ***Indicate the value to customers and the community***
- ***State the project objective***
- ***Outline the performance expectations.***

## Options

List the alternatives, including the base case (do nothing or status quo) option.

- ***Describe the options (including proposed project) that meet the objective***
- ***Describe the base case option (do nothing or status quo) and the impact of not meeting the objective.***

## Benefit/Cost Analysis

This section of the PDP presents your benefit cost analysis. In it, you must include the following:

- ***A Perspectives Summary table***
- ***A Comparison of Options NPV chart.***

These two data tables present the summary results of your economic analysis. Provide a Perspectives Summary table for each option. Instructions for each type of table are presented in [“Creating a Perspectives Summary Table”](#) and [“Creating the Options Comparison NPV Chart”](#).

Also include a Sensitivity Analysis Chart. See [“Showing Sensitivity Analysis”](#) for instructions.

## Recommendation

This section makes the direct request for a specific option, its funding, and timing.

- ***Request project funding and recommend timing. Describe what the funding will be used for.***
- ***Specify project phasing and follow-up. Describe opportunities for evaluating continued funding of work and criteria for success.***
- ***Schedule and budget. PDP #2 needs to specify a schedule and budget. It should include a first-year spending plan. This information sets accountabilities and parameters for a Change PDP.***
- ***Make recommendations for what would trigger a Change PDP. Change PDPs are approved for three types of change: schedule, scope and performance.***

See [“Select Rules for Presenting Economic Analysis”](#) for more details on how to make your recommendation.

## Creating the Perspectives Summary Table

Prepare a summary data table by perspectives for each option. This table appears in the Benefit/Cost Analysis section of the PDP. The Perspectives Summary table shows the incidence of costs and benefits by different perspective. Because all projects differ, you'll need to prepare a breakout of cost and benefit incidence specific to your project.

		Perspectives		
Types of Costs		Direct Beneficiaries	SPU Ratepayers	Other Community
Benefit	Present Value Costs			
	Financial			
	Capital			
	O & M			
	Risk Cost			
	Social Cost			
	Environmental Cost			
Present Value Benefits				
Financial Benefits				
Social Benefits				
Environmental Benefits				
Net Present Value				

Figure 4. Sample Perspectives Summary Table

Using the NPV Spreadsheet (or Life-cycle Cost Spreadsheet) from Step 2, fill in the Perspectives Summary Table:

- *Provide the present value of the financial, social, and environmental costs and benefits for all options.*
- *Show relevant perspectives. Who will receive benefits and who will incur costs? Perspectives should include direct beneficiaries of the project or people the project negatively influences. If direct beneficiaries form a distinct subset (a neighborhood, a select group of customers), name them as such. Other perspectives may include SPU customers/ratepayers and the community at large.*
- *If you are doing a cost-effectiveness analysis, you may not have any benefits to show. Or you may have only small incidental benefits that work to offset life-cycle costs. If so, show Life-cycle Cost rather than NPV on the bottom line.*

## Creating the Options Comparison NPV Chart

Using the NPV spreadsheet (or Life-cycle Cost spreadsheet) from Step 2, compare options by creating the Options NPV Chart. Place it in the Benefits/Cost Analysis section of the PDP.

- *Show the NPV for the triple bottom line of financial, social, and environmental costs and benefit for all options.*
- *If you are doing a cost-effectiveness analysis, you'll show Life-cycle Cost rather than NPV.*

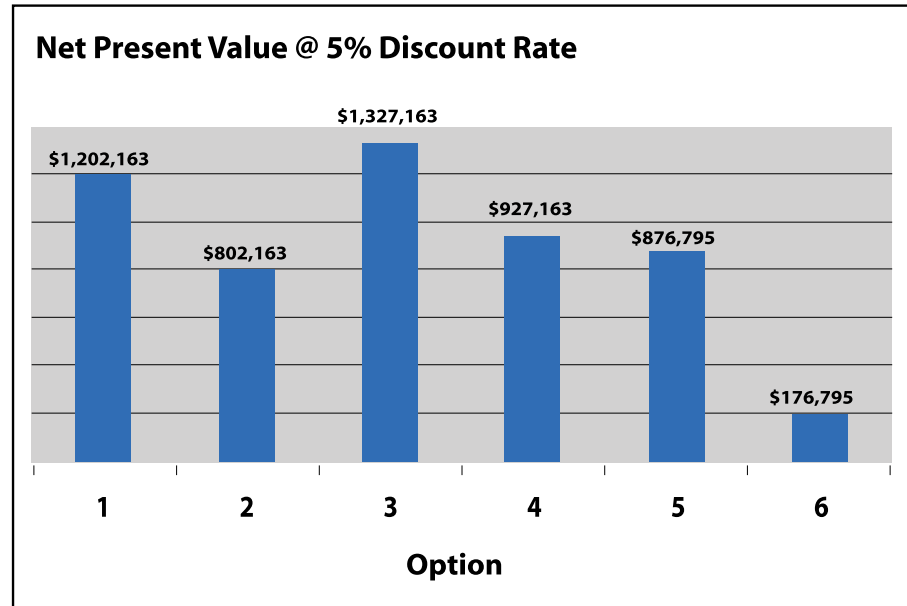


Figure 5. Options NPV Chart

Discount Rate  
Check out the  
latest SPU standard  
discount rate. [Discount  
Rate Standards.](#)

## Showing the Results of Sensitivity Analysis

In the Benefit/Cost Analysis section, you must show the impact on NPV (or Life-cycle Cost) of changing estimates or assumptions that are most uncertain. A table or chart showing the results is the best way to do this. Also show the impact of varying the discount rate. See [Triple Bottom Line Guidebook](#). Some projects will not need sensitivity analysis. However, you must make the case for that by stating why your project does not need sensitivity analysis.

		Assumption #1	Assumption #2	Assumption #3
PV Benefits	Option A	– \$100,000	– \$150,000	– \$200,000
	Option B	\$150,000	\$100,000	\$75,000
	Option C	\$25,000	\$100,000	\$175,000
	Option D	\$75,000	\$50,000	\$50,000

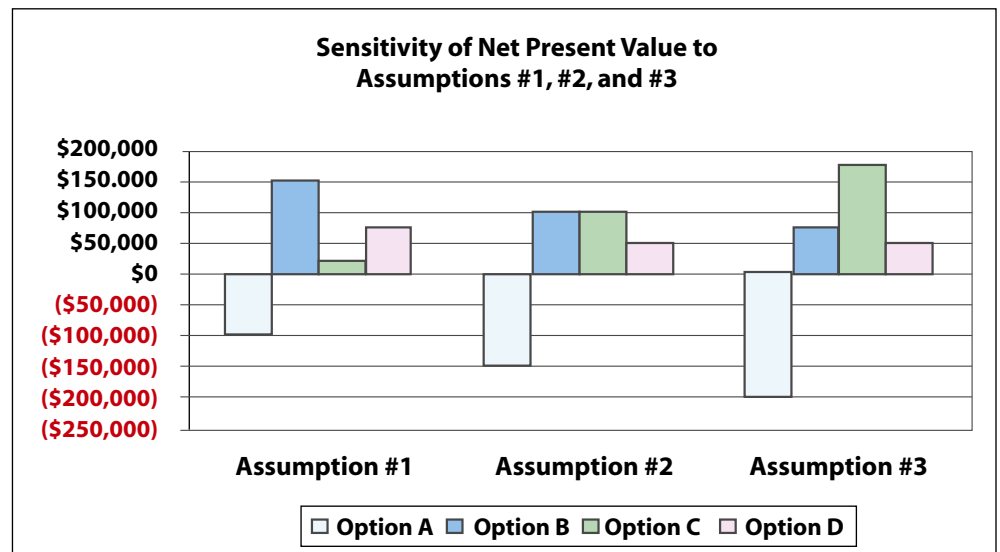
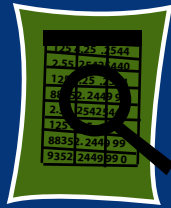


Figure 6. Sensitivity Analysis Chart

## Select Rules for Presenting Economic Analysis

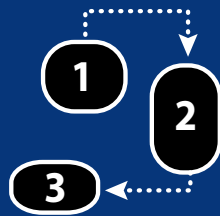
As with Step 2 analysis, certain rules apply to what you must state in your Recommendation section.



**Cost Estimate Detail.** You must provide sufficient cost estimating detail so the AMC can understand how you obtained your figures and how the requested funding will be spent. Labor, capital, contracting, design, O&M costs must be detailed enough that the AMC can understand the budget implications and be confident that estimates are accurate.



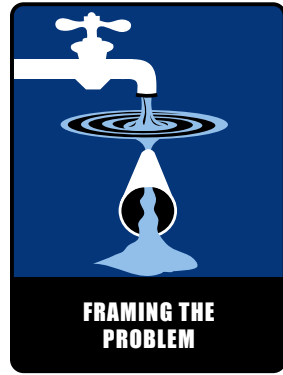
**When Future SPU O&M Cost Savings Are Included in NPV or Life-cycle Cost.** If the project includes future budget reductions compared to current SPU O&M expenditures, you must say how the project will realize those cost savings (especially SPU labor savings). If your project will not reduce future O&M budgets over current, you must state that these are “soft” project savings. You need also to say how not realizing projected savings is justified if the project is approved.



**Project Phasing.** If the project is to be done in phases, and the PDP is a request for partial funding to complete an early phase, a plan for subsequent PDPs on later phases must be shown. Include expected benefits and costs of later phases. Check our website for the minimum PDP analysis requirements for the first phase preliminary engineering. See [Requirements for Preliminary Engineering Phase of PDP](#).



**Post-completion Review.** Indicate how and when the AMC will see actual project results against business case projections.



## APPENDIX A PDP Quick Reference Card

Use the Quick Reference Card. It offers a “snapshot” of each step in developing your plan.

# Quick Card

## step 1: framing the problem

Getting Started	Page	Tips
<b>How do I schedule a PDP?</b> <ul style="list-style-type: none"> <li>E-mail Liz Kelly to get scheduled ..... 10</li> <li>Liz will assign an Executive Sponsor and CAM reviewer.. Contact Jenny Bagby (684-7808) to get an economist assigned to your PDP and Brian Spindor (684-8512) for an Operations Branch liaison. .... 10</li> <li>Check on availability of training, Contact Tim Skeel <b>(6-9084)</b> ..... 10</li> </ul>		<ul style="list-style-type: none"> <li>The AM website has in-depth information to help answer many of your questions</li> <li>The AM website is a resource for forming your PDP review team</li> </ul>
Determine Objective		
<b>How do I begin the analysis?</b> <ul style="list-style-type: none"> <li>Establish objective by asking--               <ul style="list-style-type: none"> <li><i>What problem or opportunity does the project address?</i> ..... ?????</li> <li><i>What is the function of the project?</i></li> <li><i>What value to customer and community does the function provide?</i></li> <li><i>Combine function and value to determine the objective of the project</i></li> </ul> </li> </ul>		<ul style="list-style-type: none"> <li>Function is a primary service or output of the project</li> <li>Value is what the customer or the community think that function is worth</li> </ul>
Define Options		
<b>How do I define the options?</b> <ul style="list-style-type: none"> <li>Define the base case “do-nothing” or “status quo” option first by asking: ..... 14-16               <ul style="list-style-type: none"> <li><i>What function will not be fulfilled?</i></li> <li><i>What value to customers or community will not be attained under do nothing?</i></li> </ul> </li> <li>Now define the other options by asking: ..... 17               <ul style="list-style-type: none"> <li><i>What else could SPU do to provide the function and value and meet the objective?</i></li> </ul> </li> </ul>		<ul style="list-style-type: none"> <li>Either “do nothing” or “status quo” is the base case from which costs and benefits are compared</li> </ul>
Choose Type of Analysis		
<b>How do I know which analysis to use?</b> <ul style="list-style-type: none"> <li>Choose the Type of Analysis by asking: ..... 17               <ol style="list-style-type: none"> <li><i>Is the project objective to meet a regulatory requirement or maintain a core service of unquestionable value? (must-do function) Is “do nothing” an untenable option?</i></li> <li><i>Do all the options provide the same function and value?</i> ..... 17</li> </ol> </li> <li>If <b>yes</b> to both, then do <b>cost-effectiveness</b> analysis</li> <li>If <b>no</b> to either, then do <b>benefit/cost</b> analysis. Benefits are the quantified dollar value of the project function. Benefits are what customers will pay for a function. .... 17</li> </ul>		<ul style="list-style-type: none"> <li>There are 2 types of analysis for PDPs: cost-effectiveness and benefit/cost</li> <li>Cost-effectiveness analysis is simple lifecycle cost comparisons of options using present value.</li> <li>Benefit/cost analysis is more complicated. It requires defining benefits and giving them a dollar value</li> </ul>
Bring in an Economist		
At the end of Step 1 you are <b>required</b> to contact the economist assigned to your PDP (if you haven’t already!) ..... 19		<ul style="list-style-type: none"> <li>Don’t forget to bring an economist on board before you begin Step 2. It saves time and effort</li> </ul>

# Quick Card

## step 2: data and analysis

Gather the Raw Data	Page	Tips
<b>How do I start the analysis?</b> <ul style="list-style-type: none"> <li>• Get the data together. You may be entering it into a spreadsheet at this point. .... 22</li> <li>• We give instructions for using SPU spreadsheets for either must-do (cost-effectiveness) <b>or</b> may-or-may-not-do (benefit/cost analysis) projects. .... 24</li> </ul>		<ul style="list-style-type: none"> <li>• <b>Make the analysis efficient.</b> Follow the <b>80/20 rule</b>. If you've estimated costs, it may be clear not all benefits have to be quantified to see which option is best</li> </ul>
<b>Do Cost-Effectiveness Analysis</b>		
<b>How do I do the analysis for must-do projects?</b> <ul style="list-style-type: none"> <li>• Know the terms. At a minimum get a working definition of <b>triple bottom line, net present value, perspectives, and risk costs</b> ..... 24</li> <li>• Use the <a href="#">Life-cycle Cost spreadsheet</a> for “<b>must-do</b>” functions ..... 24</li> <li>• Create a copy of the worksheet under a tab for each option ..... 24</li> <li>• Type project title and option name on the worksheet ..... 24</li> <li>• Enter costs as described below for the Net Present Value spreadsheet ..... 24</li> </ul> <b>(OR)</b>		<ul style="list-style-type: none"> <li>• “<b>Must-do</b>” functions are required by regulation or are core services of SPU.</li> <li>• The Life-cycle Cost spreadsheet helps identify the lowest cost option</li> </ul>
<b>Do Benefit/Cost Analysis</b>		
<b>How do I do benefit/cost analysis?</b> <ul style="list-style-type: none"> <li>• Know the terms. At a minimum get a working definition of <b>triple bottom line, net present value, perspectives, and risk costs</b> ..... 24</li> <li>• Use the <a href="#">Net Present Value (NPV) spreadsheet</a> ..... 25</li> <li>• Create a copy of the worksheet under a tab for each option ..... 25</li> <li>• Type project title and option name on the worksheet ..... 21</li> <li>• Determine the Life of Project ..... 25</li> <li>• <b>RULE: Life Assumptions.</b> Take cash flow analysis as far as the longest life option. .... 25</li> <li>• Enter Costs by perspective. .... 26</li> <li>• <b>RULE: Discount Rate.</b> Use constant year dollars and real discount rates. .... 26</li> <li>• Begin by entering capital costs: design, materials, construction, permitting, and disposal, etc. .... 26</li> <li>• Enter O&amp;M costs: running a facility or program, maintenance ..... 26</li> <li>• <b>RULE: Labor Rate Multiplier.</b> When calculating SPU labor costs, use overhead and fringe multiplier of 108% of hourly wage rate. .... 26</li> <li>• <b>RULE: Equipment Rates.</b> Ask your economist. .... 26</li> <li>• Enter social costs: traffic disruption, diminished aesthetics, service outages, etc. .... 27</li> <li>• Enter environmental costs: negative impacts on air, water quality, habitat, species, etc. ... 27</li> <li>• Enter risk costs: events that might occur such as asset or operational failure, etc. .... 27</li> <li>• Enter <b>Benefits by perspective</b> ..... 28</li> <li>• <b>RULE: Discount Rate.</b> Use constant year dollars and real discount rates. .... 29</li> <li>• Enter financial benefits: reduced utility costs, including reduced risk cost, increased service output with market priced value, etc. .... 28</li> <li>• Enter social benefits dollar values: improved aesthetics, recreation, convenience, safety, etc. .... 28</li> <li>• Enter environmental benefits dollar values: water quality, clear stormwater discharge, sanitary solid waste disposal, etc. .... 28</li> </ul>		<ul style="list-style-type: none"> <li>• Benefit/Cost analysis applies to <b>May-or-May-Not-Do</b> projects. Those projects often involve service level choices.</li> <li>• The NPV spreadsheet calculates a triple bottom line of financial, social and environmental benefits minus costs.</li> <li>• Steel and labor have a dollar cost based on market price. Social and environmental benefits and costs are more difficult to determine. You and your economist create a value for these. For example, a tree that maintains surface water quality by reducing erosion factors has a value based on customers' or the community's willingness to pay</li> </ul>
<b>Calculate Present Value to Determine NPV</b>		
<ul style="list-style-type: none"> <li>• Calculate the Present Value of both the benefit and cost flows to determine the Net Present Value. .... 29</li> </ul>		<ul style="list-style-type: none"> <li>• Excel does this for you.</li> </ul>



# Quick Card

## step 3: presenting the results

Format the PDP	Page	Tips
<p>How should I present the PDP?</p> <ul style="list-style-type: none"> <li>• Go to <a href="#">Asset Management website</a> for the PDP template ..... 31</li> <li>• Provide a Table of Contents that has 5 basic sections: background, objectives, options, benefit/cost analysis, life-cycle cost, recommendation ..... 31</li> <li>• Background: outline the problem or opportunity, give relevant history ..... 31</li> <li>• Objectives: describe the <b>function</b> of project or program, state the <b>value</b>, list the options. Include "do nothing" option and impact of not meeting objective ..... 31</li> <li>• Follow the <i>Guide</i> for content ..... 31</li> </ul>		<ul style="list-style-type: none"> <li>• Required forms to be submitted with PDP are on the AM website</li> </ul>
Create Perspectives Summary Table		
<p>How do I show the benefit/cost analysis results??</p> <ul style="list-style-type: none"> <li>• Create a Perspectives Summary Table. Place it in the Benefits/Cost section ..... 33</li> <li>• Show present value of financial, social and environmental costs and benefits ..... 33</li> <li>• Show perspectives (who receives benefits and incurs costs) ..... 33</li> <li>• If doing only cost-effectiveness, show life-cycle cost in bottom line (not Net Present Value) ..... 33</li> </ul>		<ul style="list-style-type: none"> <li>• Perspectives include direct beneficiaries or people negatively impacted</li> <li>• Cost-effective analysis results may not have any benefits. Or benefits may be only incidental e.g. open space improvement</li> </ul>
Create Comparing Options NPV Chart		
<p>How do I show comparison of the Options?</p> <ul style="list-style-type: none"> <li>• Create an Options NPV Chart ..... 34</li> <li>• Show NPV for triple bottom line: financial, social and environmental costs ..... 34</li> <li>• For cost-effectiveness, show life-cycle costs for each option. The preferred option is the least-cost option ..... 34</li> <li>• For benefit/cost analysis the preferred option is the one with the highest net present value. .... 34</li> </ul>		<ul style="list-style-type: none"> <li>• Use the NPV spreadsheet from Step 2 to come up with these numbers</li> </ul>
Show Sensitivity Analysis Results		
<p>How do I show the impact of NPV (or life-cycle cost) of changing estimates or assumptions?</p> <ul style="list-style-type: none"> <li>• Show results for changing estimates or assumptions that are most uncertain or have the largest influence on results ..... 35</li> </ul>		<ul style="list-style-type: none"> <li>• Presume you have to provide sensitivity analysis. Otherwise, you must say why this analysis isn't needed</li> <li>• Contact your economist</li> </ul>
Make Recommendation		
<p>What do I recommend?</p> <ul style="list-style-type: none"> <li>• Recommend a specific option ..... 32</li> <li>• Request funding ..... 36</li> <li> <p><b>RULE: Cost Estimate Detail.</b> Give enough detail so the AMC clearly understands how you obtained your figures and how the funding will be spent. .... 36</p> <p><b>RULE: When Future SPU O&amp;M cost reductions are included in NPV (or Life-cycle Cost).</b> If the project includes future budget reductions compared to current SPU O&amp;M, show how those cost savings will be realized--especially labor. If future O&amp;M budgets are not likely to be reduced, show "soft" project savings. .... 36</p> </li> <li>• Recommend timing ..... 36</li> <li> <p><b>RULE: Post-Completion Review.</b> Show how and when AMC will see project results against business case projections ..... 36</p> </li> <li>• Specify project phasing and follow-up for evaluating continued funding ..... 36</li> <li> <p><b>RULE: Project Phasing.</b> If a project phase requests partial funding, show a plan for PDPs for later phasing. .... 36</p> </li> </ul>		<ul style="list-style-type: none"> <li>• Benefit/cost analysis usually recommends the option with the highest NPV</li> <li>• Cost-effectiveness analysis recommends the option with the lowest life-cycle cost</li> </ul>